

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) A power amplifier module which is a power amplifier module using a bipolar transistor as an amplifying element, wherein when a forward base current increases from an idling current and produces an amount of an overcurrent exceeding a previously set value, by detecting the amount of the overcurrent and subtracting the amount of the overcurrent from the base current, an increase in a collector current of the amplifying element is restricted.

2. (Currently amended) A power amplifier module comprising:

a signal amplifying portion including at least a bipolar transistor as an amplifying element and amplifying and outputting an input signal;

a bias circuit for providing an idling current to the signal amplifying portion; and

a protecting circuit constituted such that when a forward base current of the bipolar transistor increases

from an idling current and exceeds a predetermined value, a current having an amount of exceeding the predetermined value flows from the bias circuit to the protecting circuit;

wherein by making the amount of exceeding the predetermined value of the base current flow to the protecting circuit, an output of the signal amplifying portion is restricted to be equal to or smaller than a predetermined value.

3. (Currently amended) A power amplifier module comprising:

a bipolar transistor for amplifying and outputting an input signal; and

a protecting circuit for detecting that a ~~forward~~ base current of the bipolar transistor increases from an idling current and exceeds a predetermined value and subtracting a detected amount of exceeding the predetermined value of the base current from the base current:

wherein by controlling the base current of the bipolar transistor by the protecting circuit, a collector current of the bipolar transistor is restricted to be equal to or lower than a predetermined value.

4. (Original) The power amplifier module according to Claim 2, wherein the signal amplifying portion includes a matching circuit and the bipolar transistor constitutes a portion of a current mirror circuit.

5. (Previously presented) The power amplifier module according to Claim 2, wherein the bias circuit includes a current source and a transistor and the transistor constitutes a current mirror circuit along with another transistor connected in series with the current source.

6. (Previously presented) The power amplifier module according to Claim 2, wherein the protecting circuit includes a first transistor, a first resistor connected to a base of the first transistor, a second resistor one end of which is connected to an emitter of the first transistor and another end of which is connected to the first resistor, a second transistor connected to a collector of the first transistor and a third transistor constituting a current mirror circuit along with the second transistor and connected to the bias circuit.

7. (Original) The power amplifier module according to Claim 2, wherein the predetermined value of the base current

is made variable in accordance with a change in a power supply voltage.

8. (Original) The power amplifier module according to Claim 7, further comprising:

a voltage to current conversion circuit for inputting an output control voltage, converting the output control voltage into a current and controlling an output current of a current source;

a power supply voltage detecting circuit for detecting a power supply voltage and converting the power supply voltage into a current and outputting the current; and

a current control circuit for inputting an output current of the power supply voltage detecting circuit, converting the output current into a voltage and controlling the voltage to current conversion circuit such that when the voltage is larger than a predetermined voltage, the output current of the voltage to current conversion circuit becomes substantially constant with regard to an input of the output control voltage equal to or higher than the voltage.

9. (Original) The power amplifier module according to Claim 2, further comprising diodes for clipping voltage

connected in multiple stages in parallel with the amplifying element.

10. (Original) The power amplifier module according to Claim 2, wherein the amplifying element is constituted by GaAs-HBT or SiGe-HBT and the protecting circuit includes an Si-bipolar transistor or SiGe-HBT.

11. (Original) The power amplifier module according to Claim 2, wherein the amplifying element and protecting circuit are constituted by SiGe-HBT or an Si-bipolar transistor and are integrated into a single chip.

12. (Previously presented) The power amplifier module according to Claim 2, further comprising:

a plurality of stages of the amplifying elements connected in series with each other;  
wherein at least the amplifying element at a final stage is protected by the protecting circuit.

13. (Original) The power amplifier module according to Claim 12,

wherein the final stage amplifying element is constituted by GaAs-HBT and at least one of an initial stage

or an intermediary stage amplifying element is constituted by Si-MOSFET.

14. (Original) The power amplifier module according to Claim 12,

wherein the final stage amplifying element is constituted by GaAs-HBT and the amplifying element at an initial stage or at least a portion of the protecting circuit is constituted by a Si-MOSFET.

15. (Original) A wireless communication apparatus having the power amplifier module according to Claim 2, wherein a voice signal is modulated, the modulated voice signal is amplified by the power amplifier module and a modulated signal is outputted via an antenna.

16. (Original) A wireless communication apparatus comprising the power amplifier module according to Claim 2, an antenna, a receiving front end portion, a frequency synthesizer, a voice processing portion and a modulator and de-modulator.